# IB946

Intel ® Core™ 2 Duo/GM45

Half Size PISA CPU Card

# USER'S MANUAL

Version 1.0

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# Introduction

## Product Description

The IB946 Half Size CPU card incorporates the Mobile Intel® GM45 Express Chipset for Embedded Computing, consisting of the Intel® GM45 Graphic Memory Controller Hub (GMCH) and Intel® I/O Controller Hub (ICH9-M), an optimized integrated graphics solution with a 1066MHz and 800MHz front-side bus.

The integrated powerful 3D graphics engine, based on Intel® Graphics Media Accelerator X3500 (Intel® GMA X3500) architecture, operates at core speeds of up to 533 MHz. It features a low-power design, is validated with the Intel® Core 2 Duo processors on 45nm process. With dual channel DDR2 800MHz two SoDIMM sockets on board, the board supports up to 4GB of DDR2 system memory.

Intel® Graphics supports a unique intelligent memory management scheme called Dynamic Video Memory Technology (DVMT). DVMT handles diverse applications by providing the maximum (384MB) availability of system memory for general computer usage, while supplying additional graphics memory when a 3D-intensive application requests it. The Intel GMA X3500 graphics architecture also takes advantage of the high-performance Intel processor. Intel GMA X3500 graphics supports Dual Independent Display technology.

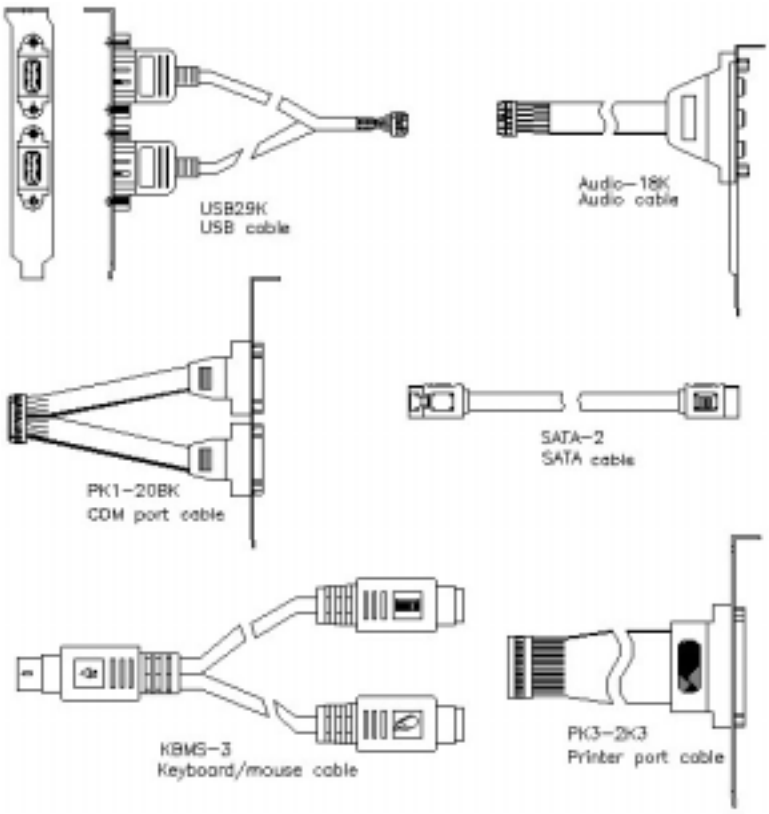
The main features of the board are:

- Supports Intel® Core™ 2 Duo (Penryn 1066MHz)
- Supports up to 2.53GHz, 1066MHz/800MHz FSB
- Two DDR2 SoDIMM, Max. 4GB memory
- Onboard Gigabit PHY LAN
- Intel® GM45 Express VGA for CRT / LVDS
- 2x SATA, 6x USB 2.0, 4x COM, Watchdog timer
- 1x Mini PCI-E(x1) Socket
- Type 2 CF socket on board

## Checklist

Your IB946 package should include the items listed below.

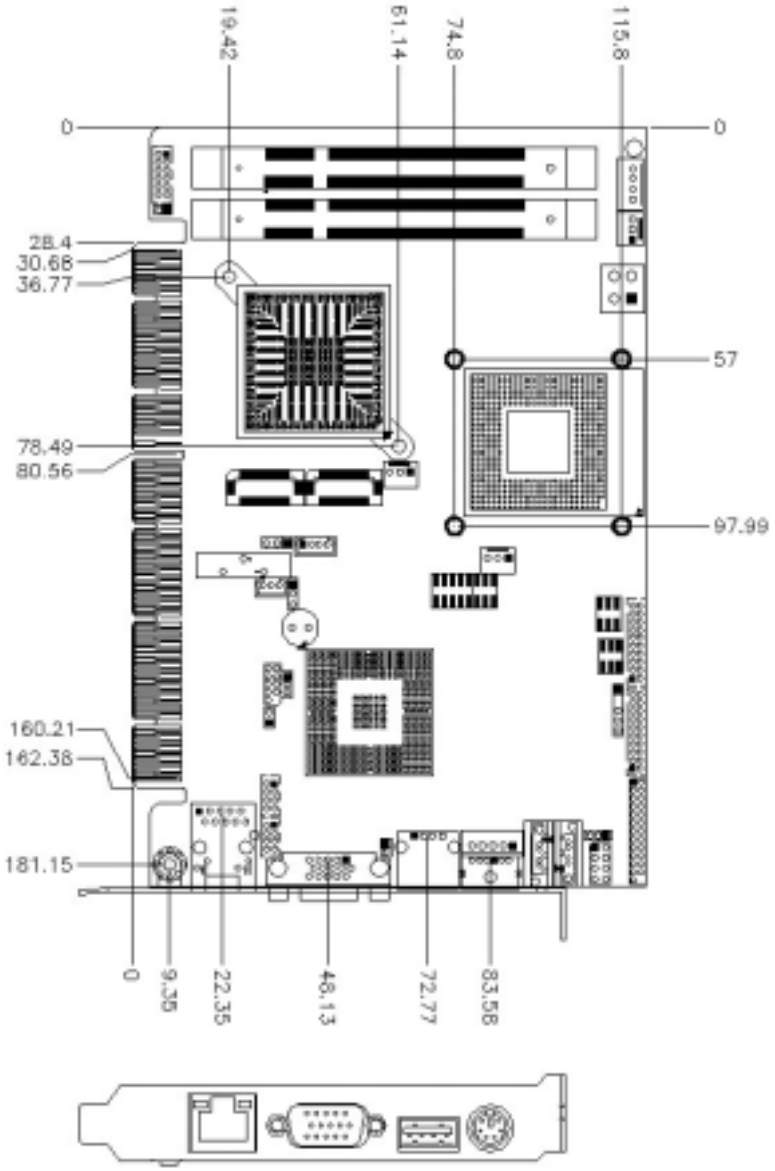
- The IB946 Half Size CPU CARD
- This User's Manual
- 1 CD containing chipset drivers and flash memory utility
- Cable kit Serial port (PK1K-20B) x1; (USB29K) x1;(SATA-2) x1
- Optional Cable LPT (PK3-2K3) x1;(KBMS-3)x1;(Audio-18)x1

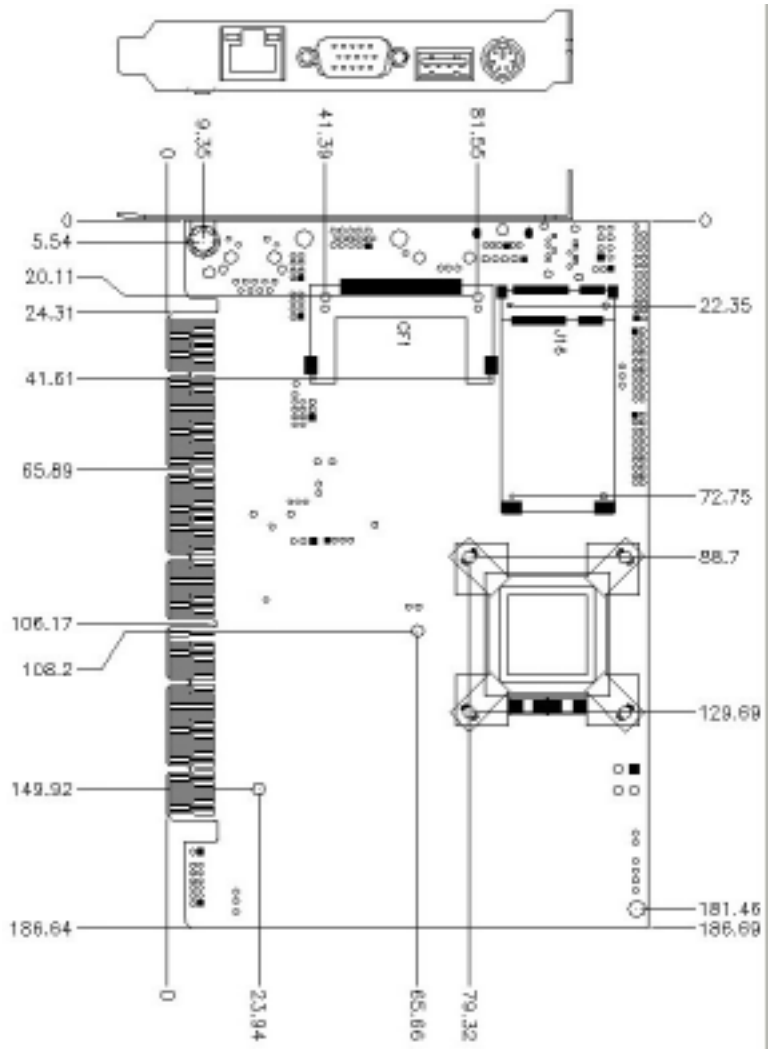


# IB946 Specifications

| | |
|---|---|
| **Form Factor** | PCI+ ISA (CPU card half size) |
| **CPU Type** | Intel mobile Core™2 Duo (Merom core) for Penryn |
| **System Speed** | Penryn-QC/Penryn-DC/Penryn-DC3M/Penryn-SC |
| **CPU Operate Frequency** | 667/800/1066MHz FSB |
| **L2Cache** | 4MB |
| **Green /APM** | APM1.2 |
| **CPU Socket** | Socket 478 (Socket P) |
| **Chipset** | INTEL GM45 (Cantiga) chipset<br>GMCH: 82GM45 1329-pin FCBGA (12W)<br>ICH9M: 82801M 676-pin PBGA (2.5W) |
| **BIOS** | Award BIOS, support ACPI Function |
| **Memory** | DDRII 667/800 DDRII SO-DIMM x2 (w/o ECC), Max. 4GB |
| **VGA & LVDS** | GM45 built-in Intel gen.5.0 Graphics Media Accelerator (533MHz 1.05V), supports DirectX10 for CRT & LVDS (single/dual channel 18-bits/ 24-bit) |
| **Backlight Control (LVDS)** | Yes |
| **LAN** | - ICH9M 10/100/gigabit MAC + PHY (dual footprint option):<br>• Intel 82567LM 10/100/1000 |
| **USB** | ICH9M built-in USB 2.0 host controller, support 6 ports |
| **Serial ATA** | ICH9M built-in SATA controller, supports 2 ports |
| **Parallel IDE (RFD)** | JMicron JM368 (PCI-e to PATA) x1 for 1 PATA channel forCF |
| **PCI-to-ISA bridge** | ITE IT8888G x1 for high drive ISA bus |
| **Audio** | ICH9M built-in High Definition Audio controller + HDA Codec Realtek ALC662 w/ 5.1 channels |
| **LPC I/O** | Winbond W83627EHG: IrDA x1, COM1 (RS232), COM2 (RS232/422/485), Hardware monitor (3 thermal inputs, 4 voltage monitor inputs, VID0-4 & 2 Fan Headers) |
| **2nd LPC I/O** | Fintek F81216AD, Support COM3 (RS232) & 4 (RS232) |
| **Digital IO** | 4 in & 4 out |
| **Expansion Slots** | Mini PCI-Express socket x1 @ solder side |
| **Edge Connector** | PS/2 Connector x1 for keyboard/mouse (KB priority)<br>DB15 x1 for VGA<br>RJ45 x1 for LAN<br>USB X 1 |
| **On Board Header/Connector** | Compact Flash type II socket x1 @solder side<br>26 pins box-header x1 for parallel port<br>20 pins DF11 x2 for COM1~4<br>10 pins pin-header x1 for Digital I/O<br>10 pins pin-header x 4 for USB 1~4<br>DF13-20 connector x2 for LVDS<br>12 pins pin-header x1 for audio Line-Out, Line-In & Mic<br>SATA connector x2 for SATA ports<br>3 pins pin-header x 1 for battery monitoring (JST PHR type) |
| **Watchdog Timer** | Yes (256 segments, 0, 1, 2…255 sec/min) |
| **System Voltage** | +5V, +12V, -12V, 5VSB (2A) |
| **Power** | AT/ATX function supported,<br>4-pin outlet power connector on board |
| **Other** | Modem Wakeup, LAN Wakeup |
| **RoHS** | Yes |
| **Board Size** | 186mm x 129mm |

## Board Dimensions




0
9.35
41.39
81.55
0
5.54
20.11
24.31
41.61
65.89
106.17
108.2
149.92
186.64
0
23.94
65.66
79.32
22.35
72.75
88.7
129.69
181.46
186.69

# Installations

This section provides information on how to use the jumpers and connectors on the IB946 in order to set up a workable system. The topics covered are:

Installing the CPU ..... 7
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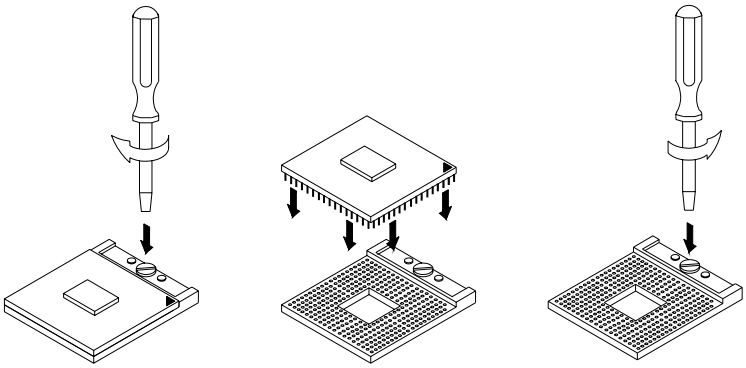
## Installing the CPU

The IB946 board supports a Socket P processor socket for Intel® Core™ 2 Duo, Intel® Celeron mobile processors.
The processor socket comes with a screw to secure the processor. As shown in the left picture below, loosen the screw first before inserting the processor. Place the processor into the socket by making sure the notch on the corner of the CPU corresponds with the notch on the inside of the socket. Once the processor has slide into the socket, fasten the screw. Refer to the figures below.



***NOTE**: Ensure that the CPU heat sink and the CPU top surface are in total contact to avoid CPU overheating problem that would cause your system to hang or be unstable.*

***WARNING:** The CN4 power connector provides the 12V power to the CPU and must be used. When CN4 is not used, only one pin from the goldfinger/backplane is providing 12V, and in the long term this could cause the goldfinger to be burnt.*

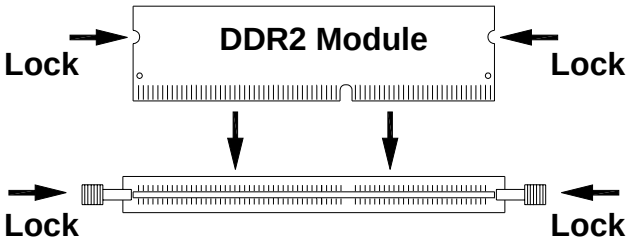
# Installing the Memory

The IB946 board supports two DDR2 SODIMM memory socket for a maximum total memory of 4GB in DDR2 memory type.

**Installing and Removing Memory Modules**

To install the DDR2 modules, locate the memory slot on the board and perform the following steps:

1. Hold the DDR2 module so that the key of the DDR2 module aligned with that on the memory slot.
2. Gently push the DDR2 module in an upright position until the clips of the slot close to hold the DDR2 module in place when the DDR2 module touches the bottom of the slot.
3. To remove the DDR2 module, press the clips with both hands.



# Setting the Jumpers

Jumpers are used on IB946 to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors on IB946 and their respective functions.

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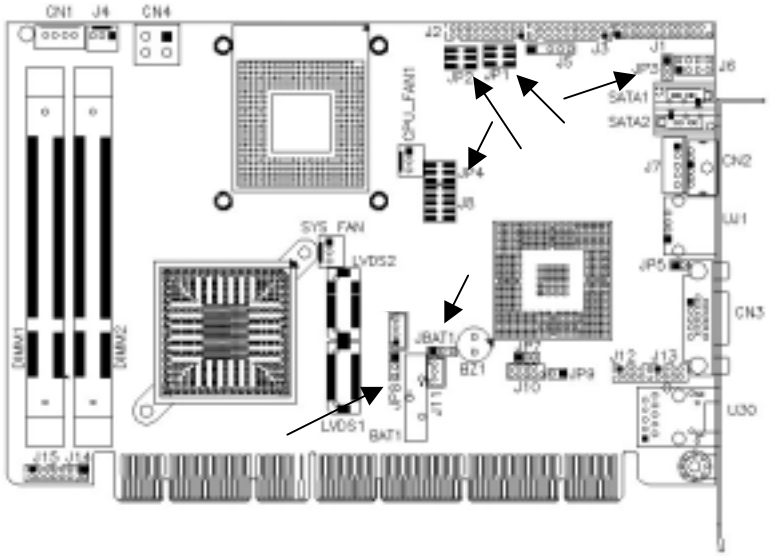
JBAT1: Clear CMOS Setting ..... 11
JP1, JP2, JP4: RS232/422/485 (COM2) Selection ..... 11
JP3: AT / ATX Power Select..... 12
JP8: LCD Panel Power Selection ..... 12

**Jumper Locations on IB946**

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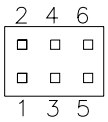
JP1, JP2, JP4: RS232/422/485 (COM2) Selection ..... 11
JP3: AT / ATX Power Select..... 12
JP8: LCD Panel Power Selection..... 12

### JBAT1: Clear CMOS Setting

| JBAT1 | Setting |
|---|---|
| | Normal |
| | Clear CMOS |

### JP1, JP2, JP4: RS232/422/485 (COM2) Selection

COM1/COM3/COM4 are fixed for RS-232 use only.
COM2 is selectable for RS232, RS-422 and RS-485.
The following table describes the jumper settings for COM2 selection.




| COM2 Function | RS-232 | RS-422 | RS-485 |
|---|---|---|---|
| Jumper Setting (Pin closed) | JP4: 1-2<br>JP1: 3-5 & 4-6<br>JP2: 3-5 & 4-6 | JP4: 3-4<br>JP1: 1-3 & 2-4<br>JP2: 1-3 & 2-4 | JP4: 5-6<br>JP1: 1-3 & 2-4<br>JP2: 1-3 & 2-4 |

COM2 is jumper selectable for RS-232, RS-422 and RS-485.

| Pin # | Signal Name | | |
|---|---|---|---|
| | RS-232 | R2-422 | RS-485 |
| 11 | DCD | TX- | DATA- |
| 13 | RX | TX+ | DATA+ |
| 15 | TX | RX+ | NC |
| 17 | DTR | RX- | NC |
| 19 | Ground | Ground | Ground |
| 12 | DSR | RTS- | NC |
| 14 | RTS | RTS+ | NC |
| 16 | CTS | CTS+ | NC |
| 18 | RI | CTS- | NC |
| 20 | NC | NC | NC |

**JP3: AT / ATX Power Select**

| JP3 | Power Supply |
|---|---|
| | ATX |
| | AT |

**JP8: LCD Panel Power Selection**

| JP8 | LCD Panel Power |
|---|---|
| | 3.3V |
| | 5V |

# Connectors on IB946

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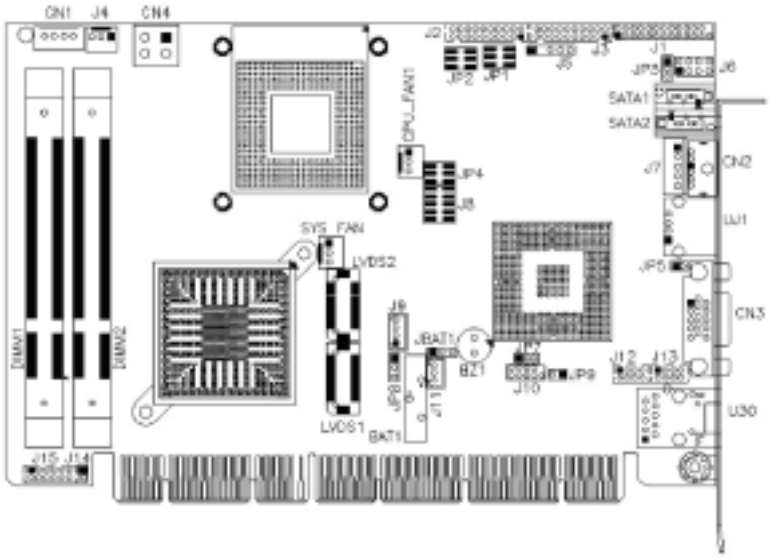
J12: USB4/USB5 Connector(DF11 Connector) ..... 20
J13: USB2/USB3 Connector(DF11 Connector) ..... 20
J14: SPDIF Out Connector ..... 20
J15: Audio Connector (DF11 Connector) ..... 21
J16: Mini PCI-E(x1) Socket ..... 21
SATA1, SATA2: SATA Connectors ..... 21

## Connector Locations on IB946

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J8: Digital I/O (4 in, 4 out) ..... 20
J11: For testing use ..... 20
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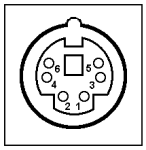
J14: SPDIF Out Connector ..... 20
J15: Audio Connector (DF11 Connector) ..... 21
J16: Mini PCI-E(x1) Socket ..... 21
SATA1, SATA2: SATA Connectors ..... 21

### CN2: PS/2 Keyboard and Mouse Connector

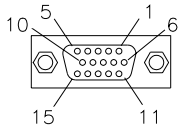
CN2 uses a Y-cable for a PS/2 keyboard and a PS/2 mouse.



CN2

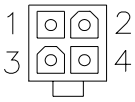
| Pin # | Signal Name |
|---|---|
| 1 | Keyboard data |
| 2 | Mouse data |
| 3 | Ground |
| 4 | Vcc |
| 5 | Keyboard Clock |
| 6 | Mouse Clock |

### CN3: VGA Connector




| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| Red | 1 | 2 | Green |
| Blue | 3 | 4 | N.C. |
| GND | 5 | 6 | GND |
| GND | 7 | 8 | GND |
| N.C. | 9 | 10 | GND |
| N.C. | 11 | 12 | N.C. |
| HSYNC | 13 | 14 | VSYNC |
| NC | 15 | | |

### CN4: ATX 12V/+12V Power Connector




| Pin # | Signal Name |
|---|---|
| 1 | Ground |
| 2 | Ground |
| 3 | +12V |
| 4 | +12V |

***WARNING:*** *The CN4 power connector provides the 12V power to the CPU and must be used. When CN4 is not used, only one pin from the goldfinger/backplane is providing 12V, and in the long term this could cause the goldfinger to be burnt.*

### UJ1: USB 1 Port

### U30: Gigabit LAN RJ45 Port

### SYS_FAN1: System Fan Power Connector

This is a 3-pin header for system fans. The fan must be a 12V fan.

| Pin # | Signal Name |
|---|---|
| 1 | Ground |
| 2 | +12V |
| 3 | Rotation detection |

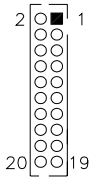
### CPU_FAN1: CPU Fan Power Connector

| Pin # | Signal Name |
|---|---|
| 1 | Ground |
| 2 | +12V |
| 3 | Rotation detection |

### CN1: HDD Power Connector

| Pin # | Signal Name |
|---|---|
| 1 | +5V |
| 2 | Ground |
| 3 | Ground |
| 4 | +12V |

### J2: COM1, COM2 Serial Port (DF11 Connector)

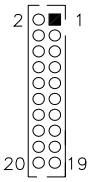



| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| DSR1 | 2 | 1 | DCD1 |
| RTS1 | 4 | 3 | RXD1 |
| CTS1 | 6 | 5 | TXD1 |
| RI1 | 8 | 7 | DTR1 |
| NA | 10 | 9 | Ground |
| DSR2 | 12 | 11 | DCD2 |
| RTS2 | 14 | 13 | RXD2 |
| CTS2 | 16 | 15 | TXD2 |
| RI2 | 18 | 17 | DTR2 |
| NA | 20 | 19 | Ground |

COM2 is jumper selectable for RS-232, RS-422 and RS-485.

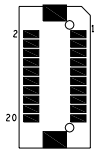
| Pin # | Signal Name | | |
|---|---|---|---|
| | **RS-232** | **R2-422** | **RS-485** |
| 11 | DCD | TX- | DATA- |
| 13 | RX | TX+ | DATA+ |
| 15 | TX | RX+ | NC |
| 17 | DTR | RX- | NC |
| 19 | Ground | Ground | Ground |
| 12 | DSR | RTS- | NC |
| 14 | RTS | RTS+ | NC |
| 16 | CTS | CTS+ | NC |
| 18 | RI | CTS- | NC |
| 20 | NC | NC | NC |

### J3: COM3, COM4 Serial Port(DF11 Connector)



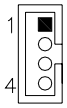

| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| DSR3 | 2 | 1 | DCD3 |
| RTS3 | 4 | 3 | RXD3 |
| CTS3 | 6 | 5 | TXD3 |
| RI3 | 8 | 7 | DTR3 |
| NA | 10 | 9 | Ground |
| DSR4 | 12 | 11 | DCD4 |
| RTS4 | 14 | 13 | RXD4 |
| CTS4 | 16 | 15 | TXD4 |
| RI4 | 18 | 17 | DTR4 |
| NA | 20 | 19 | Ground |

### LVDS1, LVDS2: LVDS Connectors (1st channel, 2nd channel)



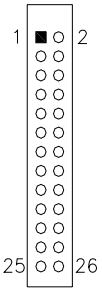

| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| TX0- | 2 | 1 | TX0+ |
| Ground | 4 | 3 | Ground |
| TX1- | 6 | 5 | TX1+ |
| 5V/3.3V | 8 | 7 | Ground |
| TX3- | 10 | 9 | TX3+ |
| TX2- | 12 | 11 | TX2+ |
| Ground | 14 | 13 | Ground |
| TXC- | 16 | 15 | TXC+ |
| 5V/3.3V | 18 | 17 | ENABKL |
| +12V | 20 | 19 | +12V |

### J9: LCD Backlight Connector



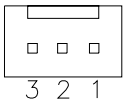

| Pin # | Signal Name |
|---|---|
| 1 | +12V |
| 2 | Backlight Enable |
| 3 | Brightness Control |
| 4 | Ground |

### J1: Parallel Port Connector




| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| Line printer strobe | 1 | 2 | AutoFeed |
| PD0, parallel data 0 | 3 | 4 | Error |
| PD1, parallel data 1 | 5 | 6 | Initialize |
| PD2, parallel data 2 | 7 | 8 | Select |
| PD3, parallel data 3 | 9 | 10 | Ground |
| PD4, parallel data 4 | 11 | 12 | Ground |
| PD5, parallel data 5 | 13 | 14 | Ground |
| PD6, parallel data 6 | 15 | 16 | Ground |
| PD7, parallel data 7 | 17 | 18 | Ground |
| ACK, acknowledge | 19 | 20 | Ground |
| Busy | 21 | 22 | Ground |
| Paper empty | 23 | 24 | Ground |
| Select | 25 | 26 | N/A |

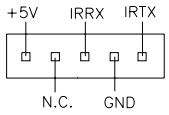
### J4: ATX Power Connector




| Pin # | Signal Name |
|---|---|
| 1 | Ground |
| 2 | PS_On |
| 3 | +5VSB |

### J5: IrDA Connector

J5 is used for an optional IrDA connector for wireless communication.




| Pin # | Signal Name |
|---|---|
| 1 | +5V |
| 2 | No connect |
| 3 | Ir RX |
| 4 | Ground |
| 5 | Ir TX |

### J6: System Function Connector

**ATX Power ON Switch: Pins 1 and 2**
This 2-pin connector is an "ATX Power Supply On/Off Switch" on the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will force the system to power off.

**Power LED: Pins 3 and 4**

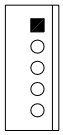
| Pin # | Signal Name |
|---|---|
| 3 | Vcc |
| 4 | Ground |

**Hard Disk Drive LED Connector: Pins 5 and 6**
This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.

| Pin # | Signal Name |
|---|---|
| 6 | HDD Active |
| 5 | Vcc |

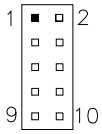
**Reset Switch: Pins 7 and 8**
The reset switch allows the user to reset the system without turning the main power switch off and then on again.

### J7: External Keyboard Connector



| Pin # | J7 |
|---|---|
| 1 | KB clock |
| 2 | KB data |
| 3 | N.C. |
| 4 | Ground |
| 5 | Vcc |

### J8: Digital I/O (4 in, 4 out)

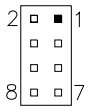



| Signal Name | Pin | Pin | Signal Name |
|---|---|---|---|
| GND | 1 | 2 | VCC |
| OUT3 | 3 | 4 | OUT1 |
| OUT2 | 5 | 6 | OUT0 |
| IN3 | 7 | 8 | IN1 |
| IN2 | 9 | 10 | IN0 |

### J11: For testing use

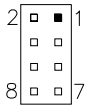
| Pin # | Signal Name |
|---|---|
| 1 | MCU-BAT3V |
| 2 | BAT3V |
| 3 | Ground |

### J12: USB4/USB5 Connector(DF11 Connector)




| Signal Name | Pin | Pin | Signal Name |
|---|---|---|---|
| Ground | 2 | 1 | Vcc |
| D5+ | 4 | 3 | D4- |
| D5- | 6 | 5 | D4+ |
| Vcc | 8 | 7 | Ground |

### J13: USB2/USB3 Connector(DF11 Connector)

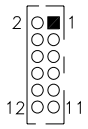



| Signal Name | Pin | Pin | Signal Name |
|---|---|---|---|
| Ground | 2 | 1 | Vcc |
| D3+ | 4 | 3 | D2- |
| D3- | 6 | 5 | D2+ |
| Vcc | 8 | 7 | Ground |

### J14: SPDIF Out Connector

| Pin # | Signal Name |
|---|---|
| 1 | SPDIF out |
| 2 | Ground |

### J15: Audio Connector (DF11 Connector)




| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| LINEOUT_R | 2 | 1 | LINEOUT_L |
| Ground | 4 | 3 | JD_FRONT |
| LINEIN_R | 6 | 5 | LINEIN |
| Ground | 8 | 7 | JD_LINEIN |
| MIC-In | 10 | 9 | MIC_L |
| Ground | 12 | 11 | JD_MIC1 |

### J16: Mini PCI-E(x1) Socket

### SATA1, SATA2: SATA Connectors

### CF1: CF Socket

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# BIOS Setup

This chapter describes the different settings available in the Award BIOS that comes with the board. The topics covered in this chapter are as follows:

BIOS Introduction ..... 24
BIOS Setup ..... 24
Standard CMOS Setup ..... 26
Advanced BIOS Features ..... 29
Advanced Chipset Features ..... 32
Integrated Peripherals ..... 34
Power Management Setup ..... 38
PNP/PCI Configurations ..... 41
PC Health Status ..... 42
Frequency/Voltage Control ..... 43
Load Fail-Safe Defaults ..... 44
Load Optimized Defaults ..... 44
Set Supervisor/User Password ..... 44
Save & Exit Setup ..... 44
Exit Without Saving ..... 44

## BIOS Introduction

The Award BIOS (Basic Input/Output System) installed in your computer system's ROM supports Intel processors. The BIOS provides critical low-level support for a standard device such as disk drives, serial ports and parallel ports. It also adds virus and password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

## BIOS Setup

The Award BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the Award BIOS is immediately activated. Pressing the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup. If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again. The following message will appear on the screen:

```
Press  <DEL>  to  Enter  Setup
```

In general, you press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help and <Esc> to quit.

When you enter the Setup utility, the Main Menu screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

Phoenix - AwardBIOS CMOS Setup Utility

| | |
|---|---|
| Standard CMOS Features | Frequency/Voltage Control |
| Advanced BIOS Features | Load Fail-Safe Defaults |
| Advanced Chipset Features | Load Optimized Defaults |
| Integrated Peripherals | Set Supervisor Password |
| Power Management Setup | Set User Password |
| PnP/PCI Configurations | Save & Exit Setup |
| PC Health Status | Exit Without Saving |
| ESC : Quit | ↑ ↓ → ← : Select Item |
| F10 : Save & Exit Setup | |
| Time, Date, Hard Disk Type… | |

The section below the setup items of the Main Menu displays the control keys for this menu. At the bottom of the Main Menu just below the control keys section, there is another section, which displays information on the currently highlighted item in the list.

***Note:*** *If the system cannot boot after making and saving system changes with Setup, the Award BIOS supports an override to the CMOS settings that resets your system to its default.*

***Warning:*** *It is strongly recommended that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both Award and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could cause the system to become unstable and crash in some cases.*

## Standard CMOS Setup

"Standard CMOS Setup" choice allows you to record some basic hardware configurations in your computer system and set the system clock and error handling. If the motherboard is already installed in a working system, you will not need to select this option. You will need to run the Standard CMOS option, however, if you change your system hardware configurations, the onboard battery fails, or the configuration stored in the CMOS memory was lost or damaged.

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features

| | | Item Help |
|---|---|---|
| Date (mm:dd:yy) | Wed, Apr 28, 2007 | |
| Time (hh:mm:ss) | 00 : 00 : 00 | Menu Level > |
| IDE Channel 0 Master | None | Change the day, month, |
| IDE Channel 1 Slave | None | Year and century |
| IDE Channel 2 Master | None | |
| IDE Channel 2 Slave | None | |
| IDE Channel 3 Master | None | |
| IDE Channel 3 Slave | None | |
| IDE Channel 4 Master | None | |
| IDE Channel 4 Slave | None | |
| Video | EGA/VGA | |
| Halt On | All, But Keyboard | |
| Base Memory | 640K | |
| Extended Memory | 129024K | |
| Total Memory | 130048K | |

At the bottom of the menu are the control keys for use on this menu. If you need any help in each item field, you can press the <F1> key. It will display the relevant information to help you. The memory display at the lower right-hand side of the menu is read-only. It will adjust automatically according to the memory changed. The following describes each item of this menu.

### Date

The date format is:

| | |
|---|---|
| **Day :** | **Sun to Sat** |
| **Month :** | **1 to 12** |
| **Date :** | **1 to 31** |
| **Year :** | **1999 to 2099** |

To set the date, highlight the "Date" field and use the PageUp/ PageDown or +/- keys to set the current time.

### Time

The time format is: **Hour : 00 to 23**
**Minute : 00 to 59**
**Second : 00 to 59**

To set the time, highlight the "Time" field and use the <PgUp>/ <PgDn> or +/- keys to set the current time.

### IDE Channel Master/Slave

The onboard PCI IDE connector provides Primary and Secondary channels for connecting up to two IDE hard disks or other IDE devices.

Press <Enter> to configure the hard disk. The selections include Auto, Manual, and None. Select 'Manual' to define the drive information manually. You will be asked to enter the following items.

| | |
|---|---|
| **CYLS :** | Number of cylinders |
| **HEAD :** | Number of read/write heads |
| **PRECOMP :** | Write precompensation |
| **LANDING ZONE :** | Landing zone |
| **SECTOR :** | Number of sectors |

The Access Mode selections are as follows:

| | |
|---|---|
| CHS | (HD < 528MB) |
| LBA | (HD > 528MB and supports Logical Block Addressing) |
| Large | (for MS-DOS only) |
| Auto | |

**Remarks**: The main board supports two serial ATA ports and are represented in this setting as IDE Channel 0.

### Video

This field selects the type of video display card installed in your system. You can choose the following video display cards:

| | |
|---|---|
| EGA/VGA | For EGA, VGA, SEGA, SVGA or PGA monitor adapters. (default) |
| CGA 40 | Power up in 40 column mode. |
| CGA 80 | Power up in 80 column mode. |
| MONO | For Hercules or MDA adapters. |

### Halt On

This field determines whether or not the system will halt if an error is detected during power up.

| | |
|---|---|
| No errors | The system boot will not be halted for any error that may be detected. |
| All errors | Whenever the BIOS detects a non-fatal error, the system will stop and you will be prompted. |
| All, But Keyboard | The system boot will not be halted for a keyboard error; it will stop for all other errors |
| All, But Diskette | The system boot will not be halted for a disk error; it will stop for all other errors. |
| All, But Disk/Key | The system boot will not be halted for a keyboard or disk error; it will stop for all others. |

## Advanced BIOS Features

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features

| | | |
|---|---|---|
| CPU Feature | Press Enter | ITEM HELP |
| Hard Disk Boot Priority | Press Enter | |
| Virus Warning | Disabled | Menu Level > |
| CPU L3 Cache | Enabled | |
| Quick Power On Self Test | Enabled | |
| First Boot Device | Hard Disk | |
| Second Boot Device | CDROM | |
| Third Boot Device | USB-CDROM | |
| Boot Other Device | Enabled | |
| Boot Up NumLock Status | On | |
| Gate A20 Option | Fast | |
| Typematic Rate Setting | Disabled | |
| Typematic Rate (Chars/Sec) | 6 | |
| Typematic Delay (Msec) | 250 | |
| Security Option | Setup | |
| APIC Mode | Enabled | |
| MPS Version Control for OS | 1.4 | |
| OS Select For DRAM>64MB | Non-OS2 | |
| Small Logo (EPA) Show | Disabled | |
| Summary Screen Show | Disabled | |

### CPU Feature

Press Enter to configure the settings relevant to CPU Feature.

### Hard Disk Boot Priority

With the field, there is the option to choose, aside from the hard disks connected, "Bootable add-in Cards" which refers to other external devices.

### Virus Warning

If this option is enabled, an alarm message will be displayed when trying to write on the boot sector or on the partition table on the disk, which is typical of the virus.

### Quick Power On Self Test

When enabled, this field speeds up the Power On Self Test (POST) after the system is turned on. If it is set to *Enabled*, BIOS will skip some items.

### First/Second/Third Boot Device

These fields determine the drive that the system searches first for an operating system. The options available include *Floppy*, *LS120*, *Hard Disk, CDROM, ZIP100*, *USB-Floppy*, *USB-ZIP*, *USB-CDROM*, *LAN* and *Disable*.

### Boot Other Device

These fields allow the system to search for an OS from other devices other than the ones selected in the First/Second/Third Boot Device.

### Boot Up NumLock Status

This allows you to activate the NumLock function after you power up the system.

### Gate A20 Option

This field allows you to select how Gate A20 is worked. Gate A20 is a device used to address memory above 1 MB.

### Typematic Rate Setting

When disabled, continually holding down a key on your keyboard will generate only one instance. When enabled, you can set the two typematic controls listed next. By default, this field is set to ***Disabled.***

### Typematic Rate (Chars/Sec)

When the typematic rate is enabled, the system registers repeated keystrokes speeds. Settings are from 6 to 30 characters per second.

### Typematic Delay (Msec)

When the typematic rate is enabled, this item allows you to set the time interval for displaying the first and second characters. By default, this item is set to ***250msec.***

### Security Option

This field allows you to limit access to the System and Setup. The default value is ***Setup***. When you select *System,* the system prompts for the User Password every time you boot up. When you select *Setup,* the system always boots up and prompts for the Supervisor Password only when the Setup utility is called up.

### APIC Mode

APIC stands for Advanced Programmable Interrupt Controller. The default setting is ***Enabled***.

### MPS Version Control for OS

This option is specifies the MPS (Multiprocessor Specification) version for your operating system. MPS version 1.4 added extended configuration tables to improve support for multiple PCI bus configurations and improve future expandability. The default setting is ***1.4***.

### OS Select for DRAM > 64MB

This option allows the system to access greater than 64MB of DRAM memory when used with OS/2 that depends on certain BIOS calls to access memory. The default setting is ***Non-OS/2***.

### Small Logo (EPA) Show

The EPA logo appears at the right side of the monitor screen when the system is boot up. The default setting is ***Disabled***.

## Advanced Chipset Features

This Setup menu controls the configuration of the chipset.

Phoenix - AwardBIOS CMOS Setup Utility
Advanced Chipset Features

| | | ITEM HELP |
|---|---|---|
| System BIOS Cacheable | Enabled | |
| Memory Hole at 15M-16M | Disabled | |
| PCI Express Root Port Func | Press Enter | |
| VT-d | Disabled | |
| | | |
| ** VGA Setting ** | | |
| PEG/On Chip VGA Control | Auto | |
| PEG Force X1 | Disabled | |
| On-Chip Frame Buffer Size | 64MB | |
| DVMT Mode | Enabled | |
| Total GFX Memory | 128MB | |
| PAVP Mode | PAVP-Lite | |
| | | |
| Boot Display | CRT | |
| SDVO Device Setting | None | |
| SDVO LVDS Protocol | 1CH SPWG, 18bit | |
| SDVO Panel Number | 1024x768 | |
| Active LVDS Device | No LVDS | |
| Integrated LVDS Protocol | 18 bit | |
| Panel Scaling | Auto | |
| Panel Number | 1024x768 SC/DC | |
| TV1 Standard Type | VBIOS Default | |
| TV2 Standard Type | VBIOS Default | |
| BIA Control | Auto | |

### System BIOS Cacheable

The setting of *Enabled* allows caching of the system BIOS ROM at F000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

### Memory Hole At 15M-16M

In order to improve performance, certain space in memory can be reserved for ISA cards. This memory must be mapped into the memory space below 16 MB. The choices are *Enabled* and *Disabled*.

### VT-d

Virtualization solutions allow multiple operating systems and applications to run in independent partitions all on a single computer. Using virtualization capabilities, one physical computer system can function as multiple "virtual" systems.

### Intel Dynamic Video

Memory Technology 3.0 (DVMT 3.0) allows additional memory to be allocated for graphics usage based on application need. Once the application is closed, the memory that was allocated for graphics usage is then released and made available for system use. Dynamically allocating memory for graphics use ensures a sold balance between system and graphics performance.

### On-Chip VGA Setting

The fields under the On-Chip VGA Setting and their default settings are:

PEG/On Chip VGA Control: Auto
PEG Force X1: Disabled
On-Chip Frame Buffer Size: 64MB
DVMT Mode: Enabled
Total GFX Memory: 128MB
PAVP Mode: PAVP-Lite
Boot Display: CRT
SDVO Device Setting: None
SDVO LVDS Protocol: 1CH SPWG, 18bit
SDVO Panel Number: 1024x768
Active LVDS Device: No LVDS
Integrated LVDS Protocol: 18 bit
Panel Scaling: Auto
Panel Number: 1024x768 SC/DC
TV1 Standard Type: VBIOS Default
TV2 Standard Type: VBIOS Default
BIA Control: Auto

### PAVP Mode.

This setting enables/disables the Protected Audio/Video Path (PAVP) mode.

### Panel Number

These fields allow you to select the LCD Panel type. The values for these ports are:

| | | | |
|---|---|---|---|
| 640x480 | SC/DC | 1400x1050 | SC/DC |
| 800x600 | SC/DC | 1600x1050 | SC/DC |
| 1024x768 | SC/DC | 1600x1200 | SC/DC |
| 1280x600 | SC/DC | 1920x1200 | SC/DC |
| 1280x768 | SC/DC | 2048x1536 | SC/DC |
| 1280x800 | SC/DC | | |
| 1280x1024 | SC/DC | | |

### Integrated Peripherals

This section sets configurations for your hard disk and other integrated peripherals.

Phoenix - AwardBIOS CMOS Setup Utility
Integrated Peripherals

| | | |
|---|---|---|
| OnChip IDE Device | Press Enter | ITEM HELP |
| Super IO Device | Press Enter | Menu Level > |
| 2nd Super Device | Press Enter | |
| USB Device Setting | Press Enter | |

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device

| | | |
|---|---|---|
| IDE HDD Block Mode | Enabled | ITEM HELP |
| IDE DMA transfer access | Enabled | |
| IDE Primary Master PIO | Auto | Menu Level > |
| IDE Primary Slave PIO | Auto | |
| IDE Primary Master UDMA | Auto | |
| IDE Primary Slave UDMA | Auto | |
| On-Chip Secondary PCI IDE | Enabled | |
| IDE Secondary Master PIO | Auto | |
| IDE Secondary Slave PIO | Auto | |
| IDE Secondary Master UDMA | Auto | |
| IDE Secondary Slave UDMA | Auto | |
| SATA Mode | IDE | |
| LEGACY Mode Support | Disabled | |

### IDE HDD Block Mode

This field allows your hard disk controller to use the fast block mode to transfer data to and from your hard disk drive.

### IDE DMA transfer access

By default, this field is enabled.

### IDE Primary/Secondary Master/Slave PIO

These fields allow your system hard disk controller to work faster. Rather than have the BIOS issue a series of commands that transfer to or from the disk drive, PIO (Programmed Input/Output) allows the BIOS to communicate with the controller and CPU directly.

The system supports five modes, numbered from 0 (default) to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode.

### IDE Primary/Secondary Master/Slave UDMA

These fields allow your system to improve disk I/O throughput to 33Mb/sec with the Ultra DMA/33 feature. The options are *Auto* and *Disabled*.

### SATA Mode

The setting choices for the SATA Mode are IDE and AHCI Mode. Select [IDE] if you want to have SATA function as IDE. Select [AHCI] for Advanced Host Controller Interface (AHCI) feature, with improved SATA performance with native command queuing & native hot plug.

### LEGACY Mode Support

When the Serial ATA (SATA) is set with the legacy mode enabled, then the SATA is set to the conventional IDE mode. Legacy mode is otherwise known as compatible mode.

Phoenix - AwardBIOS CMOS Setup Utility
SuperIO Device

| | | ITEM HELP |
|---|---|---|
| POWER ON Function | BUTTON ONLY | |
| KB Power ON Password | Enter | |
| Hot Key power ON | Ctrl-F1 | |
| Onboard Serial Port 1 | 3F8/IRQ4 | Menu Level > |
| Onboard Serial Port 2 | 2F8/IRQ3 | |
| UART Mode Select | Normal | |
| Parallel Port | 378/IRQ7 | |
| Parallel Port Mode | SPP | |
| ECP Mode Select | EPP 1.7 | |
| ECP Mode Use Mode | 3 | |
| PWRON After PWR-Fail | Off | |

2nd Super IO Device

| | | ITEM HELP |
|---|---|---|
| Onboard Serial Port 3 | 230 | |
| Serial Port 3 Use IRQ | IRQ5 | Menu Level > |
| Onboard Serial Port 4 | 238 | |
| Serial Port 4 Use IRQ | IRQ11 | |

### Power ON Function

This field is related to how the system is powered on – such as with the use of conventional power button, keyboard or hot keys. The default is ***BUTTON ONLY***.

### KB Power ON Password

This field allows users to set the password when keyboard power on is the mode of the Power ON function.

### Hot Key Power ON

This field sets certain keys, also known as hot keys, on the keyboard that can be used as a 'switch' to power on the system.

### Onboard Serial Port/Parallel Port

These fields allow you to select the onboard serial ports and their addresses. The default values for these ports are:

| | |
|---|---|
| Serial Port 1 | 3F8/IRQ4 |
| Serial Port 2 | 2F8/IRQ3 |
| Serial Port 3 | 230/IRQ5 |
| Serial Port 4 | 238/IRQ11 |
| Parallel Port | 378/IRQ7 |

### UART Mode Select

This field determines the UART 2 mode in your computer. The default value is ***Normal***.

### Parallel Port Mode

This field allows you to determine parallel port mode function.

| | |
|---|---|
| SPP | Standard Printer Port |
| EPP | Enhanced Parallel Port |
| ECP | Extended Capabilities Port |
| ECP+EPP | Combination of ECP and EPP capabilities |
| Normal | Normal function |

### PWRON After PWR-Fail

This field sets the system power status whether *on or off* when power returns to the system from a power failure situation.

Phoenix - AwardBIOS CMOS Setup Utility
USB Device Setting

| | | |
|---|---|---|
| USB 1.0 Controller | Enabled | ITEM HELP |
| USB 2.0 Controller | Enabled | |
| USB Keyboard Function | Enable | |
| USB Mouse Function | Disable | Menu Level > |
| USB Storage Function | Enabled | |
| *** USB Mass Storage Device Boot Setting *** | | |

### USB 1.0 Controller

The options for this field are *Enabled* and *Disabled*. By default, this field is set to ***Enabled***.

### USB 2.0 Controller

The options for this field are *Enabled* and *Disabled*. By default, this field is set to ***Enabled***. In order to use USB 2.0, necessary OS drivers must be installed first. ***Please update your system to Windows XP SP2.***

### USB Keyboard/Mouse/Storage Function

The options for this field are *Enabled* and *Disabled*. By default, this field is set to ***Disabled***.

## Power Management Setup

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup

| | | ITEM HELP |
|---|---|---|
| PCI Express PM Function | Press Enter | |
| ACPI Function | Enabled | |
| ACPI Suspend | S3(STR) | Menu Level > |
| Power Management | User Define | |
| Video Off Method | V/H SYNC+ Blank | |
| Video Off In Suspend | Yes | |
| Suspend Type | Stop Grant | |
| Modem Use IRQ | 3 | |
| Suspend Mode | Disabled | |
| HDD Power Down | Disabled | |
| Soft-Off by PWR-BTTN | Instant-Off | |
| CPU THRM-Throttling | 50.0% | |
| Wake-Up by PCI Card | Disabled | |
| Power On by Ring | Disabled | |
| Resume by Alarm | Disabled | |
| Date (of Month) Alarm | 0 | |
| Time (hh:mm:ss) Alarm | 0 : 0 : 0 | |
| ** Reload Global Timer Events ** | | |
| Primary IDE 0 | Disabled | |
| Primary IDE 1 | Disabled | |
| Secondary IDE 0 | Disabled | |
| Secondary IDE 1 | Disabled | |
| FDD, COM, LPT Port | Disabled | |
| PCI PIRQ[A-D] # | Disabled | |
| HPET Support | Disabled | |
| HPET Mode | 32-bit mode | |

### ACPI Function

Enable this function to support ACPI (Advance Configuration and Power Interface).

### ACPI Suspend

The default setting of the ACPI Suspend mode is ***S3(STR)***.

### Power Management

This field allows you to select the type of power saving management modes. There are four selections for Power Management.

| | |
|---|---|
| Min. Power Saving | Minimum power management |
| Max. Power Saving | Maximum power management. |
| User Define | Each of the ranges is from 1 min. to 1hr. Except for HDD Power Down which ranges from 1 min. to 15 min. |

### Video Off Method
This field defines the Video Off features. There are three options.

| | |
|---|---|
| V/H SYNC + Blank | Default setting, blank the screen and turn off vertical and horizontal scanning. |
| DPMS | Allows BIOS to control the video display. |
| Blank Screen | Writes blanks to the video buffer. |

### Video Off In Suspend
When enabled, the video is off in suspend mode. The default setting is ***Yes***.

### Suspend Type
The default setting for the Suspend Type field is ***Stop Grant***.

### Modem Use IRQ
This field sets the IRQ used by the Modem. By default, the setting is ***3***.

### Suspend Mode
When enabled, and after the set time of system inactivity, all devices except the CPU will be shut off.

### HDD Power Down
When enabled, and after the set time of system inactivity, the hard disk drive will be powered down while all other devices remain active.

### Soft-Off by PWRBTN
This field defines the power-off mode when using an ATX power supply. The *Instant Off* mode allows powering off immediately upon pressing the power button. In the *Delay 4 Sec* mode, the system powers off when the power button is pressed for more than four seconds or enters the suspend mode when pressed for less than 4 seconds.

### Wake up by PCI Card
By default, this field is disabled.

### Power On by Ring
This field enables or disables the power on of the system through the modem connected to the serial port or LAN.

### Resume by Alarm

This field enables or disables the resumption of the system operation. When enabled, the user is allowed to set the *Date* and *Time*.

### Reload Global Timer Events

The HDD, FDD, COM, LPT Ports, and PCI PIRQ are I/O events that can prevent the system from entering a power saving mode or can awaken the system from such a mode. When an I/O device wants to gain the attention of the operating system, it signals this by causing an IRQ to occur. When the operating system is ready to respond to the request, it interrupts itself and performs the service.

## PNP/PCI Configurations

This option configures the PCI bus system. All PCI bus systems on the system use INT#, thus all installed PCI cards must be set to this value.

Phoenix - AwardBIOS CMOS Setup Utility
PnP/PCI Configurations

| | | |
|---|---|---|
| Init Display First | PCI Slot | ITEM HELP |
| Reset Configuration Data | Disabled | Menu Level |
| Resources Controlled By | Auto (ESCD) | Select Yes if you are using a Plug and Play capable operating system Select No if you need the BIOS to configure non-boot devices |
| IRQ Resources | Press Enter | |
| PCI/VGA Palette Snoop | Disabled | |
| **PCI Express relative items** | | |
| Maximum Payload Size | 4096 | |

### Init Display First

The default setting is ***PCI Card***.

### Reset Configuration Data

This field allows you to determine whether to reset the configuration data or not. The default value is ***Disabled.***

### Resources Controlled by

This PnP BIOS can configure all of the boot and compatible devices with the use of a PnP operating system such as Windows 95.

### PCI/VGA Palette Snoop

Some non-standard VGA display cards may not show colors properly. This field allows you to set whether or not MPEG ISA/VESA VGA cards can work with PCI/VGA. When this field is enabled, a PCI/VGA can work with an MPEG ISA/VESA VGA card. When this field is disabled, a PCI/VGA cannot work with an MPEG ISA/VESA card.

### Maximum Payload Size

The default setting of the PCI Express Maximum Payload Size is 4096.

## PC Health Status

This section shows the parameters in determining the PC Health Status. These parameters include temperatures, fan speeds and voltages.

Phoenix - AwardBIOS CMOS Setup Utility
PC Health Status

| | | ITEM HELP |
|---|---|---|
| Shutdown Temperature | Disabled | |
| CPU Warning Temperature | Disabled | |
| Current System Temp | 45°C/113°F | Menu Level > |
| Current CPU Temp | 45°C/113°F | |
| Current Chassis Temp | 45°C/113°F | |
| System FAN Speed | 5400 RPM | |
| CPU FAN Speed | 5400 RPM | |
| Vcore(V) | 1.02 V | |
| 12 V | 1.32 V | |
| 1.8V | 1.8V | |
| +5V | 5.25 V | |
| 3.3V | 3.37V | |
| VBAT (V) | 3.21 V | |
| 3VSB(V) | 3.01V | |
| CPU Smart Fan Temp | Disabled | |
| System Smart Fan Temp | Disabled | |

### CPU Warning Temperature

This field allows the user to set the temperature so that when the temperature is reached, the system sounds a warning. This function can help prevent damage to the system that is caused by overheating.

### Temperatures/Voltages

These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

### Shutdown Temperature

This field allows the user to set the temperature by which the system automatically shuts down once the threshold temperature is reached. This function can help prevent damage to the system that is caused by overheating.

### Smart Fan Temperature

This field enables or disables the smart fan feature. At a certain temperature, the fan starts turning. Once the temperature drops to a certain level, it stops turning again.

## Frequency/Voltage Control

This section shows the user how to configure the processor frequency.

Phoenix - AwardBIOS CMOS Setup Utility
Frequency/Voltage Control

| | | |
|---|---|---|
| Auto Detect PCI Clk | Disabled | ITEM HELP |
| Spread Spectrum Modulated | Disabled | Menu Level > |
| CPU Host/SRC/PCI Clock | Default | |

### Auto Detect PCI Clk

This field enables or disables the auto detection of the PCI clock.

### Spread Spectrum Modulated

This field sets the value of the spread spectrum. The default setting is ***Disabled***. This field is for CE testing use only.

### CPU Host/SRC/PCI Clock

By default this field is set to ***Default***.

### Load Fail-Safe Defaults

This option allows you to load the troubleshooting default values permanently stored in the BIOS ROM. These default settings are non-optimal and disable all high-performance features.

### Load Optimized Defaults

This option allows you to load the default values to your system configuration. These default settings are optimal and enable all high performance features.

### Set Supervisor Password

These two options set the system password. Supervisor Password sets a password that will be used to protect the system and Setup utility. User Password sets a password that will be used exclusively on the system. To specify a password, highlight the type you want and press <Enter>. The Enter Password: message prompts on the screen. Type the password, up to eight characters in length, and press <Enter>. The system confirms your password by asking you to type it again. After setting a password, the screen automatically returns to the main screen.

To disable a password, just press the <Enter> key when you are prompted to enter the password. A message will confirm the password to be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

### Save & Exit Setup

This option allows you to determine whether or not to accept the modifications. If you type “Y”, you will quit the setup utility and save all changes into the CMOS memory. If you type “N”, you will return to Setup utility.

### Exit Without Saving

Select this option to exit the Setup utility without saving the changes you have made in this session. Typing “Y” will quit the Setup utility without saving the modifications. Typing “N” will return you to Setup utility.

# Drivers Installation

This section describes the installation procedures for software and drivers under Windows XP. The software and drivers are included with the motherboard. If you find the items missing, please contact the vendor where you made the purchase. The contents of this section include the following:

Intel Chipset Software Installation Utility ..... 46
VGA Drivers Installation ..... 48
Realtek Audio Driver Installation ..... 50
LAN Drivers Installation ..... 51

**IMPORTANT NOTE:**
After installing your Windows operating system (Windows XP), you must install first the Intel Chipset Software Installation Utility before proceeding with the drivers installation.

# Intel Chipset Software Installation Utility

The Intel Chipset Drivers should be installed first before the software drivers to enable Plug & Play INF support for Intel chipset components. Follow the instructions below to complete the installation.

1. Insert the CD that comes with the board. Click ***Intel*** and then ***Intel(R) GM45 Chipset Drivers***.

2. Click ***Intel(R) Chipset Software Installation Utility.***

3. When the Welcome screen to the Intel® Chipset Device Software appears, click ***Next*** to continue.

4. Click ***Yes*** to accept the software license agreement and proceed with the installation process.

5. On the Readme File Information screen, click ***Next*** to continue the installation.

6. The Setup process is now complete. Click ***Finish*** to restart the computer and for changes to take effect.

# VGA Drivers Installation

To install the VGA drivers, follow the steps below to proceed with the installation.

1. Insert the CD that comes with the board. Click ***Intel*** and then ***Intel(R) GM45 Chipset Drivers***.

2. Click ***Intel(R) GM45 Chipset Family Graphics Driver.***

Inside This CD...
Version : 8.2.10
Intel(R) Chipset Software Installation Utility
Intel(R) GM45 Chipset Family Graphics Driver
Realtek High Definition Codec Audio Driver
Intel(R) PRO LAN Network Drivers

3. When the Welcome screen to the Setup Program appears, click ***Next*** to continue.

4. Click ***Yes*** to to agree with the license agreement and continue the installation.

5. On the Readme File Information screen, click ***Next*** to continue the installation of the Intel® Graphics Media Accelerator Driver.

6. On  Setup Progress screen, click ***Next*** to continue.

7. Setup complete.  Click ***Finish*** to restart the computer and for changes to take effect.

Intel® Graphics Media Accelerator Driver
Intel® Graphics Media Accelerator Driver
Setup Is Complete
intel
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart the computer now.
No, I will restart the computer later.
Click Finish, then remove any installation media from the drives.
Finish

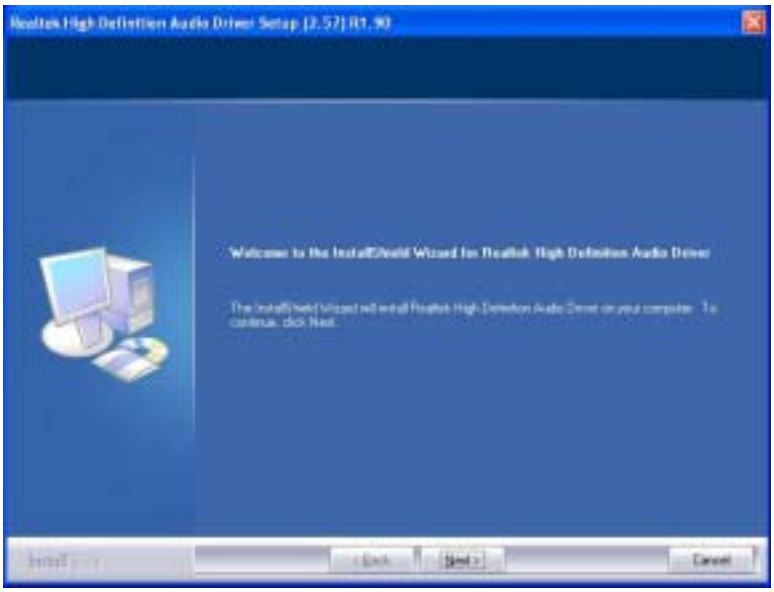
## Realtek Audio Driver Installation

1. Insert the CD that comes with the board. Click ***Intel*** and then ***Intel(R) GM45 Chipset Drivers***.

2. Click ***Realtek High Definition Audio Driver.***

Inside This CD...
Intel(R) Chipset Software Installation Utility
Intel(R) GM45 Chipset Family Graphics Driver
Realtek High Definition Audio Driver
Intel(R) PRO LAN Network Drivers

3. On the Welcome to the InstallShield Wizard screen, click ***Next***.



3. InstallShield Wizard is complete. Click ***Finish*** to restart the computer.

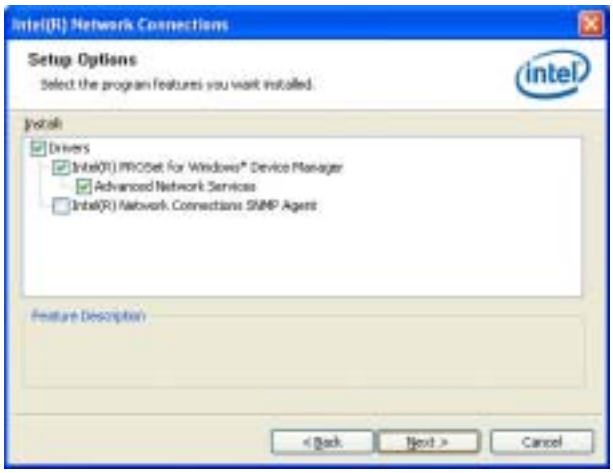
# LAN Drivers Installation

**Follow the steps below to install the Intel LAN drivers.** ***This one installation will cover both 82574L and 82567LM LAN controllers.***

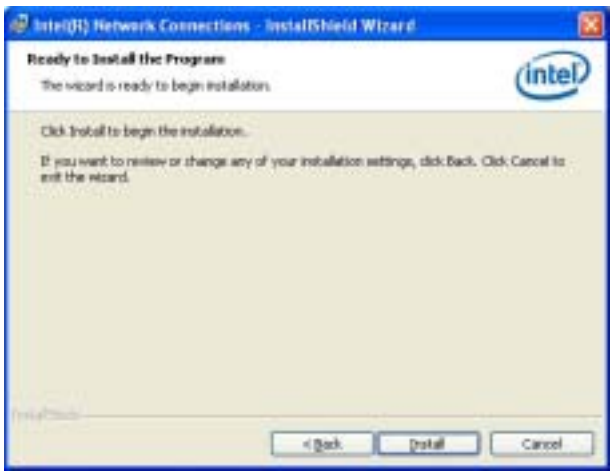
1. Insert the CD that comes with the motherboard. Click ***LAN Card*** and then ***Intel(R) PRO 82574L LAN Drivers***.

2. When the Welcome screen to the InstallShield Wizard for Intel® Network Connections appears, click ***Next***. On the next screen, click ***Yes*** to to agree with the license agreement.

3. Click the checkbox for **Drivers** in the Setup Options screen to select it and click **Next** to continue.



4. The wizard is ready to begin installation. Click ***Install*** to begin the installation.


Intel(R) Network Connections - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
< Back
Install
Cancel

5. When InstallShield Wizard is complete, click ***Finish***.

Intel(R) Network Connections - InstallShield Wizard
InstallShield Wizard Completed
To access new features, open Device Manager, and view the properties of the network adapters.
Finish

***Remarks: This Intel® PRO 82574L LAN drivers support both Intel 82574L and 82567LM LAN controllers.***

# Appendix

## A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

| Address | Device Description |
|---|---|
| 000h - 01Fh | DMA Controller #1 |
| 020h - 03Fh | Interrupt Controller #1 |
| 040h - 05Fh | Timer |
| 060h - 06Fh | Keyboard Controller |
| 070h - 07Fh | Real Time Clock, NMI |
| 080h - 09Fh | DMA Page Register |
| 0A0h - 0BFh | Interrupt Controller #2 |
| 0C0h - 0DFh | DMA Controller #2 |
| 0F0h | Clear Math Coprocessor Busy Signal |
| 0F1h | Reset Math Coprocessor |
| 1F0h - 1F7h | IDE Interface |
| 278 - 27F | Parallel Port #2(LPT2) |
| 2F8h - 2FFh | Serial Port #2(COM2) |
| 2B0 - 2DF | Graphics adapter Controller |
| 378h - 3FFh | Parallel Port #1(LPT1) |
| 360 - 36F | Network Ports |
| 3B0 - 3BF | Monochrome & Printer adapter |
| 3C0 - 3CF | EGA adapter |
| 3D0 - 3DF | CGA adapter |
| 3F0h - 3F7h | Floppy Disk Controller |
| 3F8h - 3FFh | Serial Port #1(COM1) |

# B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

| Level | Function |
|---|---|
| IRQ0 | System Timer Output |
| IRQ1 | Keyboard |
| IRQ2 | Interrupt Cascade |
| IRQ3 | Serial Port #2 |
| IRQ4 | Serial Port #1 |
| IRQ5 | Reserved |
| IRQ6 | Floppy Disk Controller |
| IRQ7 | Parallel Port #1 |
| IRQ8 | Real Time Clock |
| IRQ9 | Reserved |
| IRQ10 | Reserved |
| IRQ11 | Reserved |
| IRQ12 | PS/2 Mouse |
| IRQ13 | 80287 |
| IRQ14 | Primary IDE |
| IRQ15 | Secondary IDE |

# C. Watchdog Timer Configuration

The WDT is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven. Under normal circumstance, the user will restart the WDT at regular intervals before the timer counts to zero.

SAMPLE CODE:

```
//=====================================================================
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//=====================================================================
#include <stdio.h>
#include <stdlib.h>
#include "W627DHG.H"
//=====================================================================
int main (int argc, char *argv[]);
void copyright(void);
void EnableWDT(int);
void DisableWDT(void);
//=====================================================================
int main (int argc, char *argv[])
{
        unsigned char bBuf;
        unsigned char bTime;
        char **endptr;

        copyright();

        if (argc != 2)
        {
                printf(" Parameter incorrect!!\n");
                return 1;
        }

        if (Init_W627DHG() == 0)
        {
                printf(" Winbond 83627HF is not detected, program abort.\n");
                return 1;
        }
        bTime = strtol (argv[1], endptr, 10);
        printf("System will reset after %d seconds\n", bTime);

        EnableWDT(bTime);

        return 0;
}
//=====================================================================
```

```
void copyright(void)
{
        printf("\n======== Winbond 83627DHG Watch Timer Tester (AUTO DETECT) ========\n"\
                        "       Usage : W627E_WD reset_time\n"\
                        "       Ex : W627E_WD 3  => reset system after 3 second\n"\
                        "            W627E_WD 0  => disable watch dog timer\n");
}
//============================================================================
void EnableWDT(int interval)
{
        unsigned char bBuf;

        bBuf = Get_W627DHG_Reg( 0x2D);
        bBuf &= (!0x01);
        Set_W627DHG_Reg( 0x2D, bBuf);                   //Enable WDTO

        Set_W627DHG_LD( 0x08);                          //switch to logic device 8
        Set_W627DHG_Reg( 0x30, 0x01);                   //enable timer

        bBuf = Get_W627DHG_Reg( 0xF5);
        bBuf &= (!0x08);
        Set_W627DHG_Reg( 0xF5, bBuf);                   //count mode is second

        Set_W627DHG_Reg( 0xF6, interval);               //set timer
}
//============================================================================
void DisableWDT(void)
{
        Set_W627DHG_LD(0x08);                           //switch to logic device 8
        Set_W627DHG_Reg(0xF6, 0x00);                    //clear watchdog timer
        Set_W627DHG_Reg(0x30, 0x00);                    //watchdog disabled
}
//============================================================================
```

```
//===========================================================================
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//===========================================================================
#include "W627DHG.H"
#include <dos.h>
//===========================================================================
unsigned int W627DHG_BASE;
void Unlock_W627DHG (void);
void Lock_W627DHG (void);
//===========================================================================
unsigned int Init_W627DHG(void)
{
	unsigned int result;
	unsigned char ucDid;

	W627DHG_BASE = 0x2E;
	result = W627DHG_BASE;

	ucDid = Get_W627DHG_Reg(0x20);
	if (ucDid == 0x88)
	{	goto Init_Finish;	}

	W627DHG_BASE = 0x4E;
	result = W627DHG_BASE;
	ucDid = Get_W627DHG_Reg(0x20);
	if (ucDid == 0x88)
	{	goto Init_Finish;	}

	W627DHG_BASE = 0x00;
	result = W627DHG_BASE;

Init_Finish:
	return (result);
}
//===========================================================================
void Unlock_W627DHG (void)
{
	outportb(W627DHG_INDEX_PORT, W627DHG_UNLOCK);
	outportb(W627DHG_INDEX_PORT, W627DHG_UNLOCK);
}
//===========================================================================
void Lock_W627DHG (void)
{
	outportb(W627DHG_INDEX_PORT, W627DHG_LOCK);
}
//===========================================================================
void Set_W627DHG_LD( unsigned char LD)
{
	Unlock_W627DHG();
	outportb(W627DHG_INDEX_PORT, W627DHG_REG_LD);
	outportb(W627DHG_DATA_PORT, LD);
	Lock_W627DHG();
}
```

```
//===========================================================================
void Set_W627DHG_Reg( unsigned char REG, unsigned char DATA)
{
        Unlock_W627DHG();
        outportb(W627DHG_INDEX_PORT, REG);
        outportb(W627DHG_DATA_PORT, DATA);
        Lock_W627DHG();
}
//===========================================================================
unsigned char Get_W627DHG_Reg(unsigned char REG)
{
        unsigned char Result;
        Unlock_W627DHG();
        outportb(W627DHG_INDEX_PORT, REG);
        Result = inportb(W627DHG_DATA_PORT);
        Lock_W627DHG();
        return Result;
}
//===========================================================================




//===========================================================================
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//===========================================================================
#ifndef __W627DHG_H
#define __W627DHG_H                     1
//===========================================================================
#define         W627DHG_INDEX_PORT          (W627DHG_BASE)
#define         W627DHG_DATA_PORT           (W627DHG_BASE+1)
//===========================================================================
#define         W627DHG_REG_LD              0x07
//===========================================================================
#define W627DHG_UNLOCK                      0x87
#define         W627DHG_LOCK                0xAA
//===========================================================================
unsigned int Init_W627DHG(void);
void Set_W627DHG_LD( unsigned char);
void Set_W627DHG_Reg( unsigned char, unsigned char);
unsigned char Get_W627DHG_Reg( unsigned char);
//===========================================================================
#endif  //__W627DHG_H
```